Optimal binary solvent extraction system for phenolic antioxidants from mengkudu (Morinda citrifolia) fruit.

Abstract

Antioxidants have been widely used in the food industry to enhance product quality by preventing oxidation of susceptible substances. This work was carried out to maximise the recovery of total phenolic content (TPC), total flavonoid content (TFC), 2,2′-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid) (ABTS) radical-scavenging capacity and 2,2′-diphenyl-1-picrylhydrazyl (DPPH) radical-scavenging capacity from Morinda citrifolia fruit via modification of the ethanol concentration, extraction time and extraction temperature at minimal processing cost. The optimised conditions yielded values of 881.57 ± 17.74 mg GAE/100 g DW for TPC, 552.53 ± 34.16 mg CE/100 g DW for TFC, 799.20 ± 2.97 µmol TEAC/100 g DW for ABTS and 2,317.01 ± 18.13 µmol TEAC/100 g DW for DPPH were 75% ethanol, 40 min of time and 57 °C. The four responses did not differ significantly ($p > 0.05$) from predicted values, indicating that models obtained are suitable to the optimisation of extraction conditions for phenolics from M. citrifolia. The relative amounts of flavonoids were 0.784 ± 0.01 mg quercetin/g of extract and 1.021 ± 0.04 mg rutin/g of extract. On the basis of the results obtained, M. citrifolia extract can be used as a valuable bioactive source of natural antioxidants.

Keyword: Mengkudu (Morinda citrifolia); Total phenolic content (TPC); Total flavonoid content (TFC); 2,2`-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid) (ABTS) radical-scavenging capacity.